

Macroinvertebrate Monitoring by Volunteers: Current Status and Trends



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Newsletter

The Volunteer Monitor Newsletter

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The Volunteer Monitor Newsletter

- Only national vol mon publication
- “Trade journal” of volunteer monitoring
- Editorial board: 6 Northeast, 1 Pennsylvania, 1 Alabama, 1 Texas

www.epa.gov/owow/volunteer/vm_index.html

Popularity of volunteer macroinvertebrate monitoring

1998 Survey (responses from 772 programs)

Environments Monitored

| | |
|----------------|-----|
| River | 76% |
| Lake/Reservoir | 38% |
| Estuary/Marine | 21% |
| Wetland | 22% |
| Beach | 8% |

Parameters Tested

(by programs monitoring rivers exclusively)

Top four:

1. temperature (88%)
2. pH (78%)
3. macroinvertebrates (76%)
4. DO(73%)

the “ooh” factor

People never look at the river the same way again. It becomes a living thing, not just “water between two banks.”

– Geoff Dates, River Network

Volunteer Macroinvertebrate Monitoring - Background

Early 1970s -- Izaak Walton League of America (IWLA) “Save Our Streams”

- Identify live organisms at streamside
- Simple rating system: Sensitive, Less Sensitive, Tolerant

IWLA Revisions 2003

VA SOS study showed that traditional IWLA protocol consistently overestimates stream quality

(See Engel & Voshell, *American Entomologist* 48(3), 2002; also VM Winter 2003, p. 6)

IWLA “Sensitive” category (2003 revision)

- Caddisflies (order Trichoptera) **except net-spinners**
- Mayflies (order Ephemeroptera)
- Stoneflies (order Plecoptera)
- **Water snipe flies** (order Diptera, family Athericidae)
- Riffle beetles (order Coleoptera, family Elmidae)
- Water pennies (order Coleoptera, family Psephenidae)
- Gilled snails (class Gastropoda)

[Hellgrammites moved to “Less Sensitive” category]

IWLA-type “Streamside Survey”

- Easy to learn, fun
- Inexpensive
- Immediate results
- No killing of bugs
- Good for education
- Can distinguish very degraded sites and very good sites

Drawbacks:

- Low resolution
- No preserved specimen for later verification



Early to mid-90s: More rigorous, intensive approaches

- Maryland Save Our Streams; River Watch Network (VT); Jim Harrington (CA)
- Partly inspired by EPA's 1989 RBP guidance (RBP II protocol)
- Hallmarks of more rigorous protocol:
 - preservation of sample
 - family-level ID in lab **by volunteers**
 - quantitative: ID and count random subsample (at least 100) or whole sample

Intensive Approaches

- Higher resolution
- Bugs preserved - ID can be verified
- Highly educational

Drawbacks:

- Extensive training
- Need lab and microscopes
- Large commitment from staff and volunteers



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My investigations, early 2005 (focusing especially on ID)

Volunteer monitoring listserv survey:
“What method do you use?”

- Streamside survey
- “Intensive” - Volunteers ID to family
- Samples sent to professionals for ID

Listserv Survey Results

27 responses:

- 16 - Streamside survey
- 6 - Family ID by volunteers
 - includes 2 school programs
- 6 - Samples sent to professionals for ID

Trends and Conclusions

1. Streamside survey still very popular especially with large programs

2. “Intensive” method (family ID by volunteers) less widely used than in mid-90s

“Bug Nights”

UMMP: Every other
Wednesday evening, January
through April



Friends of Deer
Creek: Every
other Wednesday
evening, year-
round



3. Increase in “professional” ID; linked to wanting state agencies to use data

4. Some groups are using creative “hybrid” approaches that don’t fit neatly into any of the three categories

“Hybrid” Approaches

- Volunteers ID to family level in the field
- Volunteers “morphosort” preserved specimens, experts circulate around the lab identifying organisms
- Connecticut’s “Most Wanted” list

Connecticut's "Most Wanted"

Order Ephemeroptera

Genus Drunella

Genus Isonychia

Genus Epeorus

Order Plecoptera

Genus Pteronarcys

Family Peltoperlidae

Family Perlidae

Other stoneflies

Order Trichoptera

Genus Glossosoma

Genus Apatania

Genus Rhyacophila

Genus Brachycentrus

Genus Lepidostoma

Uses of Volunteer Macroinvertebrate Data

1. State-level uses

Water quality standards, biocriteria development, 303(d) listing, TMDLs

- Surest route to state use is getting samples ID'ed by professionals

Examples

- Filling gaps - Maryland Stream Waders
- 303(d) listing – Heal the Bay, Santa Monica
- Providing data to help with biocriteria development – Colorado, California

Uses, continued

2. Local uses

- Baseline data
 - especially useful on small streams no one else is monitoring
- Prioritize sites for restoration projects; support grant requests for project funding
- Assess results of restoration or remediation
- Help get special-protection designation
- Bring attention to problems
- Watershed planning and local regulations
- Community education